

WHAT IS CLAIMED IS:

1. A printing adjustment method, comprising:

providing a plurality of solid and screened density values produced by a proofing device that represent intended density values;

5 providing a plurality of solid and screened density values produced by a press output device; and

calculating, in response to selected ones of the plurality of density values produced by the press output device and selected ones of the plurality of density values produced by the proofing device, required percent dot values to be used to  
10 print on the press output device a plurality of adjusted density values that approximately correspond to the intended density values.

2. The method of claim 1, wherein calculating comprises:

selecting from the plurality of solid density values produced by the press output device values that approximately correspond to solid density aimpoints;

15 providing a statistical representation of the selected values;

performing a regression analysis of the selected values that approximately correspond to solid density aimpoints, using ones of the plurality of solid density values produced by the press output device that approximately correspond to the  
20 selected values that approximately correspond to solid density aimpoints;

applying first adjustments to at least one of the density values produced by the press output device, in response to the regression analysis and at least one of the density values produced by the proofing device; and

25 using interpolation in response to the first adjustments to provide the required percent dot values.

3. The method of claim 1, wherein calculating includes performing a regression analysis that provides a mathematical relationship between at least one of the screened density values produced by the press output device and at least one of the  
30 solid density values produced by the press output device.

4. The method of claim 1, wherein calculating includes using interpolation that comprises adjusting at least one of the screened density values produced by the press output device in response to an amount proportional to a product of a first value and a second value, wherein the first value is a percent dot value of a difference between two of the screened density values produced by the press output device, and the second value is a ratio of a difference between at least one of the intended density values and one of the two of the screened density values produced by the press output device to the difference between the two of the screened density values produced by the press output device.

5. The method of claim 1, wherein the density values represent values from which a density of a substrate on which the density values produced by the press output device have been provided has been subtracted.

6. The method of claim 1, further comprising printing an image using the required dot values.

7. The method of claim 1, wherein the plurality of solid density values produced by the press output device are varied approximately linearly in density along a first axis, the first axis approximately perpendicular to direction in which output of the press output device is produced.

8. The method of claim 7, wherein the approximately linear density variation is produced by variation in ink-film thickness.

9. The method of claim 1, wherein the screened density values include values selected from the group consisting of 5, 10, 25, 50, 75, and 90 percent dot.

10. The method of claim 1, further comprising compensating for fluctuations in printing press or peripheral printing conditions' printing characteristics using interim press profile adjustments.

11. The method of claim 1, further comprising

providing a plurality of segments produced by the press output device having a plurality of ink fountain zone controls, each of the segments having a width, a plurality of segment solid density color values each having an offset value measurable as a fraction of the width, and a segment center;

identifying at least a portion of the segments as encompassed segments relative to designated copy matter to be printed by the press output device, the encompassed segments having a first end segment and a second end segment;

calculating color density variations for at least a portion of the plurality of segment solid density color values; and

calculating, in response to the offset values and at least a portion of the color density variations, adjustment data for at least one of the ink fountain zone controls, the adjustment data operable to be used to adjust ink deliverable by the ink fountain zone control.

12. The method of claim 1, further comprising:

providing one of the group consisting of linear or transformed segments, each having a second plurality of solid and screened density values produced by the press output device;

automatically calculating density variance data between a statistical representation of at least a subset of the plurality of solid and screened density values produced by the press output device and corresponding representations of ones of at least a subset of the second plurality of solid and screened density values, the density variance data operable to be used to automatically calculate tonal reproduction adjustment values, the tonal reproduction adjustment values to be used to produce the required percent dot values.

13. A printing adjustment data form, comprising:

a plurality of solid color control regions produced by a press output device, the solid color control regions corresponding to positions approximately along an axis;

5 a plurality of screened color control regions produced by the press output device; and

wherein density values for at least two of the plurality of solid color control regions are intentionally varied using predetermined values along the axis.

10 14. The printing adjustment data form of claim 13, wherein the density values are varied approximately linearly along the axis.

15 15. The printing adjustment data form of claim 13, wherein the density values are varied by regulating ink-film thickness along the axis.

16. The printing adjustment data form of claim 13, wherein the location of at least one of the regions approximately corresponds to a position of an ink fountain zone control on the press output device.

20 17. The printing adjustment data form of claim 13, wherein the density value for at least one of the solid color control regions is selected if it corresponds to a selected target density value within a desired tolerance value.

25 18. The printing adjustment data form of claim 13, wherein density values from selected ones of the plurality of solid color control regions produced by the press output device are operable to be compared to intended density values from color control regions produced by a proofing device, density values from the plurality of screened color control regions produced by the press output device are operable to be adjusted in response to the comparison, and required percent dot values are calculated  
30 in response to the adjustment, and wherein the required percent dot values are used to print on the press output device a plurality of adjusted density values that approximately correspond to the intended density values.

19. A printing system, comprising:  
a press output device operable to print image data having density values; and  
a computer operable to provide input data to the press output device, the  
computer further operable to

5 read a plurality of solid and screened density values produced by a  
proofing device that represent intended density values;

read a plurality of solid and screened density values produced by the  
press output device; and

10 calculate, in response to selected ones of the plurality of density values  
produced by the press output device and selected ones of the plurality of  
density values produced by the proofing device, required percent dot values to  
be used to print on the press output device a plurality of adjusted density  
values that approximately correspond to the intended density values.

15 20. The system of claim 19, wherein the press output device input data  
includes data utilized with at least one of the group consisting of CTP plates,  
cylinders, interim film, and direct imaging technology.

20 21. The system of claim 19, wherein the density values are provided by  
one of the group consisting of a spectrophotometer, a densitometer and a scanner.

22. The system of claim 19, wherein the computer is further operable to calculate by including:

selecting from the plurality of solid density values produced by the press output device values that approximately correspond to solid density aimpoints;

providing a statistical representation of the selected values;

performing a regression analysis of the selected values that approximately correspond to solid density aimpoints, using ones of the plurality of solid density values produced by the press output device that approximately correspond to the selected values that approximately correspond to solid density aimpoints;

applying first adjustments to at least one of the density values produced by the press output device, in response to the regression analysis and at least one of the density values produced by the proofing device; and

using interpolation in response to the first adjustments to provide the required percent dot values.

23. The system of claim 19, wherein the computer is further operable to calculate by including performing a regression analysis that provides a mathematical relationship between at least one of the screened density values produced by the press output device and at least one of the solid density values produced by the press output device.

24. The system of claim 19, wherein the computer is further operable to calculate by including using interpolation that comprises adjusting at least one of the screened density values produced by the press output device in response to an amount proportional to a product of a first value and a second value, wherein the first value is a percent dot value of a difference between two of the screened density values produced by the press output device, and the second value is a ratio of a difference between at least one of the intended density values and one of the two of the screened density values produced by the press output device to the difference between the two of the screened density values produced by the press output device.

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26. The system of claim 19, wherein the computer is further operable to include compensating for fluctuations in printing press or peripheral printing conditions' printing characteristics using interim press profile adjustments.

27. A printed image, comprising:  
a substrate;

image data produced by a press output device residing on the substrate, the  
image data produced in response to required percent dot values automatically  
5 calculated in response to selected ones of a first plurality of solid and screened density  
values representing intended density values and selected ones of a second plurality of  
solid and screened density values, the required percent dot values produced by the  
press output device providing adjusted density values that approximately correspond  
to the intended density values; and

10 wherein the first plurality of solid and screened density values is produced by  
a proofing device and the second plurality of solid and screened density values is  
produced by the press output device.

28. The image of claim 27, wherein the image data includes data produced  
15 by at least one of the group consisting of CTP plates, cylinders, interim film, and  
direct imaging technology.

29. The image of claim 27, wherein the required percent dot values are  
calculated by including performing a regression analysis that provides a mathematical  
20 relationship between at least one of the screened density values produced by the press  
output device and at least one of the solid density values produced by the press output  
device.

30. The image of claim 27, wherein at least solid density values of the  
25 second plurality of solid and screened density values are varied approximately  
linearly in density along a first axis, the first axis approximately perpendicular to a  
direction in which the substrate on which the image data resides is processed through  
the press output device.



5 31. The image of claim 27, wherein the required percent dot values are calculated by including using interpolation that comprises adjusting at least one of the screened density values produced by the press output device in response to an amount proportional to a product of a first value and a second value, wherein the first value is a percent dot value of a difference between two of the screened density values produced by the press output device, and the second value is a ratio of a difference between at least one of the intended density values and one of the two of the screened density values produced by the press output device to the difference between the two of the screened density values produced by the press output device.

10 32. The image of claim 27, wherein the required percent dot values are calculated by including compensating for fluctuations in printing press or peripheral printing conditions' printing characteristics using interim press profile adjustments.

33. A printing adjustment application, comprising:

a computer-readable medium;

software residing on the computer-readable medium and operable to:

5 determine a mathematical relationship between a density value of a first plurality of solid color regions of image data produced by a press output device and a density value of a plurality of screened color regions of image data produced by the press output device, wherein the first plurality of solid color regions of image data produced by the press output device are intentionally varied using predetermined values;

10 adjust, in response to the mathematical relationship, the density value of the plurality of screened color regions of image data produced by the press output device and a density value of ones of a second plurality of solid color regions of image data produced by a press output device selected in response to a plurality of solid color regions of image data produced by a proofing device, wherein the plurality of solid color regions of image data produced by the proofing device represent intended density values;

15 interpolate by adjusting at least one of the plurality of screened color regions of image data produced by the press output device in response to an amount proportional to a product of a first value and a second value, wherein the first value is a difference between percent dot values of two of the plurality of screened color regions of image data produced by the press output device, and the second value is a ratio of a difference between at least one of the intended density values and one of the two of the plurality of screened color regions of image data produced by the press output device to the difference between the two of the plurality of screened color regions of image data produced by the press output device; and

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30 determine a required percent dot value in response to the interpolation, the required percent dot value operable to cause the color density value of at least one of the regions of the image data produced by the press output device to approach the intended density values of the corresponding region produced by the proofing device.

34. The application of claim 33, wherein the plurality of solid color regions of image data produced by the press output device is varied approximately linearly in density along a first axis, the first axis approximately perpendicular to a direction in which a substrate on which the image data is processed through the press output device.

35. The application of claim 33, wherein the software is further operable to compensate for fluctuations in printing press or peripheral printing conditions' printing characteristics using interim press profile adjustments.

36. The application of claim 33, wherein the first plurality of solid color regions of image data produced by the press output device is intentionally varied by variation in ink-film thickness.

37. The application of claim 33, wherein the screened density values include values selected from the group consisting of 5, 10, 25, 50, 75, and 90 percent dot.

38. The application of claim 33, wherein the software is further operable to identify at least a portion of the plurality of segments produced by the press output device as encompassed segments relative to designated copy matter to be printed by the press output device, the encompassed segments having a first end segment and a second end segment, and each of the segments having a width, a plurality of segment solid density color values each having an offset value measurable as a fraction of the width, and a segment center;

calculate color density variations for at least a portion of the plurality of segment solid density color values; and

calculate, in response to the offset values and at least a portion of the color density variations, adjustment data for at least one of a plurality of ink fountain zone controls of the press output device, the adjustment data operable to be used to adjust ink deliverable by the at least one of the plurality of ink fountain zone controls.

39. A printing adjustment method, comprising:

providing a first plurality of solid and screened density values, the first plurality produced by a press output device;

providing a second plurality of solid and screened density values;

5 automatically calculating density variance data between a statistical representation of at least a subset of the first plurality of solid and screened density values and corresponding representations of ones of at least a subset of the second plurality of solid and screened density values, the density variance data operable to be used to automatically calculate tonal reproduction adjustment values to produce data  
10 on the press output device before performing a print production run.

40. The method of claim 39, wherein the second plurality of solid and screened density values is produced by a proofing device and represent intended density values to be printed on the press output device during the production run.

15 41. The method of claim 39, wherein the second plurality of solid and screened density values is produced by the press output device and the corresponding representations of ones of at least a subset of the second plurality of solid and screened density values include adjustments made in response to a plurality of solid and screened density values produced by a proofing device, the plurality of solid and screened density values produced by the proofing device representing intended density values to be printed on the press output device during the production run.

42. The method of claim 39, further comprising:

25 providing a third plurality of solid and screened density values, the third plurality produced by the press output device;

30 automatically calculating additional density variance data between a statistical representation of at least a subset of the first plurality of solid and screened density values and corresponding representations of ones of at least a subset of the third plurality of solid and screened density values, the additional density variance data operable to be used to automatically calculate tonal reproduction adjustment values to produce data on the press output device before performing the print production run;

and wherein the first plurality of solid and screened density values includes transformed segments and linear segments and the second plurality of solid and screened density values is produced by a proofing device and represent the intended density values to be printed on the press output device during the production run.

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43. The method of claim 39, wherein the first plurality of solid and screened density values include values selected from the group consisting of 5, 10, 25, 50, 75, 90, and 100 percent dot.

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44. The method of claim 39, further comprising:

providing press profile data from the press output device;

providing proofing device profile data; and

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automatically, when desired, calculating adjustment values in density that correspond to percent data values to be printed on the press output device in response to at least one of the group consisting of the press profile data and the proofing device profile data, the adjustment values operable to reduce effects on image data produced by the press output device, the effects resulting from fluctuations in at least one of printing and peripheral printing conditions' printing characteristics.

45. A printing adjustment method, comprising:  
providing press profile data from a press output device;  
providing proofing device profile data; and

5 automatically, when desired, calculating adjustment values in density that correspond to percent data values to be printed on the press output device in response to at least one of the group consisting of the press profile data and the proofing device profile data, the adjustment values operable to reduce effects on image data produced by the press output device, the effects resulting from fluctuations in at least one of printing and peripheral printing conditions' printing characteristics.

10 46. The method of claim 45, wherein the printing and peripheral printing conditions' printing characteristics are selected from characteristics of the group consisting of paper, ink, plate, fountain solutions, image transferring cylinder blankets, press mechanical settings, ambient air conditions, ambient moisture conditions, ambient temperature conditions, and chemical residue conditions.

15 47. The method of claim 45, wherein the press profile data comprises density values provided from:

20 a plurality of solid color control regions produced by the press output device, the solid color control regions corresponding to positions approximately along an axis;

a plurality of screened color control regions produced by the press output device; and

25 wherein the density values for at least two of the plurality of solid color control regions are intentionally varied using predetermined values along the axis.

30 48. The method of claim 45, wherein the density values for at least two of the plurality of solid color control regions are varied approximately linearly along the axis.

49. A printing adjustment method, comprising:

providing a plurality of segments produced by a press output device having a plurality of ink fountain zone controls, each of the segments having a width, a plurality of segment solid density color values each having an offset value measurable as a fraction of the width, and a segment center;

identifying at least a portion of the segments as encompassed segments relative to designated copy matter to be printed by the press output device, the encompassed segments having a first end segment and a second end segment;

calculating color density variations for at least a portion of the plurality of segment solid density color values; and

calculating, in response to the offset values and at least a portion of the color density variations, adjustment data for at least one of the ink fountain zone controls, the adjustment data operable to be used to adjust ink deliverable by the ink fountain zone control.

50. The method of claim 49, wherein calculating the adjustment data further comprises:

identifying a center location of a first virtual ink fountain zone control that corresponds to a center of the first end segment and a center location of a second virtual ink fountain zone control that corresponds to a center of the second end segment;

designating in response to the offset values virtual ink fountain zone control numbers, each of which correspond to one of the at least a portion of segment solid density color values; and

interpolating color density variations associated with the at least one of the ink fountain zone controls, in response to a portion of the virtual ink fountain zone control numbers and the color density variations for the at least a portion of the plurality of segment solid density color values, to create the adjustment data.

51. The method of claim 49, wherein the color density variations are calculated as a difference in response to predetermined solid major density aimpoints.

52. The method of claim 49, wherein the virtual ink fountain zone controls are each calculated as an interpolated distance between two of the plurality of ink fountain zone controls.

5 53. The method of claim 49, further comprising determining whether at least one of the adjustment values is within a desired tolerance.

54. The method of claim 49, wherein the width is adjustable.